

## ABSTRACT OF THE DISCLOSURE

Alternating engine with recirculation of exhaust gases intended for the propulsion of automobiles and method turbocharging these motors

The invention relates to a reciprocating engine used between a minimum speed of rotation  $N_{min}$  and a maximum speed  $N_{max}$ , which comprises a turbocharging unit (2) dimensioned so as to function autonomously when:

- it supplies the intake manifold (8) of the engine with air via a coolant
- it is supplied with gas by the exhaust manifold (9, CR and CT) of the engine at the exhaust temperature
- the turbine supply pressure ( $P_3$ ) is substantially equal to the compressor discharge pressure ( $P_2$ ),

in such a way that at constant air temperature and with a fixed geometry, the turbocharging delivers a substantially constant volume of cooled air  $V_c$  when the pressure varies, and that the volume  $V_c$  is substantially proportional to the turbine outlet section  $S_d$  offered to the hot gases, characterised in that the turbine pressure ( $P_3$ ) is maintained substantially equal to the compressor pressure ( $P_2$ ) by a EGR bypass (3) between the intake manifold (8) and the exhaust manifold (9) dimensioned so as to transfer the flow of exhaust gas to the intake manifold without significant loss of pressure, and the volume of air  $V_c$  is less than the volume drawn in by the engine at the speed  $N_{max}$  in such a way that a flow of hot gases is drawn in again by the engine via the bypass (3) above the speed  $N_a$ , known as the compression adaptation speed, where the volume drawn in is equal to  $V_c$ , and a flow of air is deflected towards the turbine below the speed  $N_a$ .

Figure 1